# Water Pollution Causes Many Problems

Water is an amazing molecule that has properties that make it vital for living things and for supporting natural systems. For example, the polar properties of water enable it to dissolve a wide range of substances. This allows water to be an excellent mover of key substances in our rivers, lakes, and oceans as well as inside the bodies of all living things. We all need water to survive.
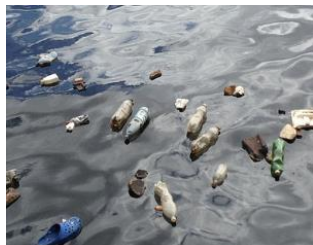
While water is a necessity for survival, it often becomes polluted by various human activities. For example, water is frequently contaminated by human sewage that isn't treated before being released into the environment.   Untreated wastewater contaminates lakes, streams, and rivers, and drinking it can cause a variety of diseases including typhoid fever and cholera.   It is estimated that wastewater related diseases kill over 3.5 million people each year.

Fortunately, some wealthier countries are able to treat and clean wastewater before it returns to the natural environment. There are three main ways that wastewater is treated. As a first step, the sewage is allowed to settle in big tanks where it is exposed to oxygen by stirring or bubbling. This stirring causes many of harmful pollutants in the water to react with the oxygen in a way that cleanses the pollutants. Next, the wastewater is filtered to remove suspended particles and impurities that remain in the water. As a final step, the water is treated chemically (usually with chlorine) to kill any potentially harmful pathogens that remain like bacteria and viruses. While polluted water can be cleaned, it is expensive and difficult to do properly.

In this STEM Challenge, your task is to design a water filtration system for a small town with a polluted water supply. Since there will be many teams of engineers working on this process, your team will focus on the filtration step.

You should begin by testing and evaluating a variety of materials that you think might work as effective filters. Once your analysis is complete, you should use your results to design a filter that you think will remove as much pollution as possible.   Good luck with your challenge.